NOT FOR PUBLICATION

ONLINE APPENDIX

Protection not for Sale, but for Tax Compliance

These appendices contain materials, results and robustness checks that supplement the main text.

Appendices

A. Protection for Tax Compliance

This section, which borrows from Queralt (2015), presents in the protection for tax compliance game in detail. Suppose there are four actors in the economy: the political ruler, the incumbent producer, a potential entrant, and labor. The economy has a fixed number L of people, who have no demand for leisure, and offer their labor inelastically. All labor is hired in the final market. Final output is produced under perfect competition, using labor and a flow of intermediate product x,

$$Y = \frac{1}{\alpha} L^{1-\alpha} x^{\alpha}$$

with constant returns, and Y being the *numéraire*. The intermediate product x is produced monopolistically using a flow of final product at a cost $\phi \leq 1$. The intermediate market might be operated by the incumbent producer or the would-be entrant. These firms differ in their marginal costs of production. The incumbent producer is assumed to operate an old technology with high marginal costs ϕ_h, and the would-be entrant a newer technology with low marginal cost ϕ_l, $\phi_l < \phi_h \leq 1$. In case of entry, firms compete in prices (capturing the logic of Schumpeterian competition). Lower marginal costs imply lower prices. Thus, in case of entry, the incumbent producer vanishes.

The monopolist, regardless of its type, seeks to maximize profit according to

$$\max_x \pi = (1-t)px - \phi_j x \tag{2}$$

where t denotes the sales tax rate imposed on the intermediate good. Since the final market is competitive, the price of the intermediate product equals the marginal product, $p = (L/x)^{1-a}$. Final sector wages equal the marginal productivity of labor, $\partial Y(x^*)/\partial L$. Accordingly, the market clearing wage is set at

$$\omega_j^* = \frac{1-\alpha}{\alpha} \left[\frac{\alpha(1-t)}{\phi_j} \right]^{\frac{\alpha}{1-\alpha}} \tag{3}$$

which decreases in the sales tax and increases in the technology vintage operated by the intermediate producer. In other words, the older the technology operated by the intermediate monopolist, the lower the equilibrium wage.

Labor derives (indirect) utility from private consumption and public good spending

$$u_L = c(t, \phi) + \rho \frac{G(t, \phi)}{L} \tag{4}$$

where c denotes private consumption of final good Y, and $\rho > 1$ the extra weight attached to per capita public spending, G/L. Private consumption is fully funded by wages. Since savings are not considered, all wage is consumed. Workers do not pay taxes (only the intermediate producer does), but their relative wages (and thus consumption) decrease with them. This characteristic intrinsically captures the regressive effect of sales taxes, which are the main tax type in developing economies (Brautigam, Fjeldstad and Moore, 2008). The second element in expression (4) captures per capita public spending. G/L is funded by the sales tax paid by the intermediate producer. For the sake of simplicity, tax revenue $T = tpx$ is assumed to be entirely funneled to public-good provision (i.e. $G \equiv T$).[1] Public spending might involve national defense, hospitals or roads. The valuation of public services is captured by ρ. The latter is assumed to be greater than one to avoid corner solutions with zero public spending. In general, one may expect ρ being high in left-leaning societies (e.g. Scandinavia), or when private alternatives are few or very expensive, which is usually the case in developing economies. Alternatively, ρ might increase on the verge of an interstate military conflict, when national defense becomes a top priority (Dincecco, 2011; Scheve and Stasavage, 2010).

The political authority (or ruler) sets entry regulation as well as the tax rate paid by the intermediate producer. The tax rate $t \geq 0$ is levied on the intermediate good only. The tax increases the price of the intermediate good, which causes a decrease in its demand and final sector wages, and ultimately in consumption. However, taxes are still necessary to fund public spending.

Initially, the tax rate is upper bounded by the stock of fiscal capacity $t \leq \tau$, $\tau < 1$. The stock of fiscal capacity determines the maximum share of private income that can be taxed by coercive means only. This share is a reflection of the strength of the administrative apparatus of the state: that is, a weak bureaucratic apparatus maps into weak fiscal capacity. The latter may be expanded over time with *costly* investments in tax administration (Besley and Persson, 2011). However, as examined below, Protection for Tax Compliance may achieve functionally equivalent levels of fiscal

[1] Appendix F accounts for inefficiencies in the provision of public goods and sunk costs of taxation.

capacity *without* pecuniary investment in the tax administration.

The ruler also sets entry regulation, which either allows or bans entry of the new, superior competitor. Entry barriers may take any form of competition or trade policy (e.g. licensing and tariffs, respectively). Either way, these measures grants the incumbent producer monopoly access to the intermediate market (Hoekman and Hostecki, 2000; Scherer, 1994). In return, the ruler demands higher tax compliance. Specifically, the ruler may protect the incumbent producer from the high-tech competitor if and only if the incumbent firm abides by a tax rate greater than the stock of fiscal capacity. Let $t_p > \tau$ be the effective tax rate in the *protectionist* regime.

If barriers are not raised (*free entry* regime), I assume that a new competitive firm enters with certainty. Competitive firms do not need protection from competition. For this very reason, the ruler cannot enforce tax rates above the stock of fiscal capacity whenever entry is allowed. In other words, the disciplinary effect of Protection for Tax Compliance based on Schumpeterian market competition becomes ineffective as soon as entry takes place. Altogether, in the free entry regime the tax rate must be set from within the fiscal capacity range $t_e \in [0, \tau]$, where subscript e stands for *entry*.

Initially, the ruler cares about aggregate well-being, which involves labor (or consumers') welfare and the domestic producer profit. She does not keep any share of T for self-consumption, nor does she accept bribes or contributions. That is, her motives are purely altruistic. This assumption serves two purposes: First, it allows us to characterize scenarios in which protection might be socially optimal. Second, eventually, it allows us to establish when and to what extent social welfare is affected by political giving.

For the sake of generality, the ruler attaches a weight a_1 to labor utility, as defined in (4), and a weight a_2 to the producer's utility, as defined in (2), with $a_1 + a_2 = 1$. Higher values of a_1 might signal higher levels of democratization (but also populism). On the contrary, higher values of a_2 might be associated with oligarchic societies, where capital monopolizes political and economic power (Acemoglu, 2008). Altogether, the benevolent ruler utility function is a linear combination of both elements:

$$V = a_1 u_L(t, \phi) + a_2 \pi(t, \phi) \tag{5}$$

Notice that expression (5) does not directly account for political survival considerations. Instead, the model implicitly assumes that satisfying some level of social welfare is always good for political survival. As such, it investigates the conditions under which social welfare (labor's and producers') is maximized. Throughout,

$$a_1\rho \geq 1 \tag{6}$$

is assumed. This condition overrules states of the world in which the ruler and labor jointly attach low valuations to public spending —thus, making taxation irrelevant.

The Protection for Tax Compliance bargain is a one-period static game with an extensive structure: First, the ruler sets entry and tax policy. If barriers are adopted, the old producer stays in and complies with $t_p > \tau$. If barriers are not raised, entry takes place, intermediate good producers compete, and the winner abides by $t_e \leq \tau$. Given entry and tax policy, tax revenue, wages and profit follow.

In anticipation of Schumpeterian competition, once protection is adopted we should not expect major deviations from $t_p > \tau$ by the domestic, obsolete producer. Simple repeated interaction between government and domestic producers should suffice to solve this kind of commitment problems.[2] And that is precisely the beauty of *creative destruction* once applied to fiscal policy. In the context of repeated interaction between a ruler in need of revenue and a producer in need of protection, the logic of Schumpeterian competition might solve the strong non-contractibility issues in taxation associated with weak fiscal capacity.

Analysis

The game model is solved by backwards induction. First, I analyze the ruler and producers' equilibrium payoffs in the cases of *free entry* and *protection* separately. Then, I examine when the ruler prefers to adopt *entry barriers* instead of allowing *free entry.*

Suppose *free entry* is adopted. Then, the new firm enters the intermediate market. Given the marginal cost differential, $\phi_h > \phi_l$, the price offered by the new producer is below that of the incumbent firm, as $\partial p^*/\partial\phi > 0$. By Schumpeterian competition, the old producer drops the market and the new entrant becomes the new intermediate monopolist.

[2] Protectionist policy (such as licenses) can easily be declined. Compliance can be assessed on a regular basis too. For instance, value added tax, the most popular tax in developing countries nowadays, is usually collected on a monthly basis. Such flexibility, combined with the incumbent's payoffs upon entry (i.e. eventual extinction) should prevent major deviations by the incumbent producer.

Given x_n^*, p_n^* offered by the *new* firm, and market-clearing wage, ω_n^*, the ruler problem reduces to

$$\begin{aligned} \max_{t_e} V = \quad & a_1\left[\omega(t, x_n^*|\phi_l) + \rho\frac{t_e p_n^* x_n^*}{L}\right] + a_2\pi(t, x_n^*|\phi_l) \\ \text{s.t. } t \leq \tau & \end{aligned} \tag{7}$$

In other words, the ruler's maximization problem is constrained by the stock of the fiscal capacity τ.[3] The maximization problem solution depends on whether the fiscal constraint binds. When it does not, $\lambda = 0$, the ruler adopts her *ideal* or unconstrained tax rate. For future reference, denote

$$t_{\lambda=0} \equiv \frac{(1-\alpha)(a_1\rho - 1)}{a_1(\rho + 1 - \alpha) - (1-\alpha)} < 1 \tag{8}$$

The unconstrained tax rate increases both in labor valuation of public spending, ρ, and the weight that the ruler attaches to labor well-being, a_1.[4] The former might increase in case of war or external threats. The latter might increase with franchise extension. Notice, however, that for $t_e^* \geq 0$, condition (6) is necessary. That is, for taxation (and public spending) to take place at all, the ruler must care minimally about labor's well-being, and the latter must minimally value public spending.

When the fiscal constraint in (7) binds, $\lambda > 0$, the ruler adopts the maximum tax rate that the endowment of fiscal capacity allows: $t_e^* = \tau$. That is, a utility welfare-maximizing ruler would set the tax rate to exhaust fiscal capacity whenever she allows for *free entry*. This is true because the ruler utility function is a strictly increasing function in $t_e \in [0, t_{\lambda=0}]$.

Suppose now that the ruler opts for protecting the incumbent firm. For the sake of simplicity, assume that the ruler conditions the entry barrier on the domestic producer's abidance with the unconstrained tax rate, $t_p^* = t_{\lambda=0}$.[5] By agreeing to the ruler's terms, the domestic firm receives the necessary protection for survival though at a significant fiscal cost. Importantly, non-contractibility problems are ruled out by the anticipated consequences of Schumpeterian competition (i.e. extinc-

[3]This set up assumes full employment upon entry. Appendix D allows for technological unemployment. Results show that the latter makes Protection for Tax Compliance more likely, not less, as it decreases the value of entry.

[4]The assumption $t \leq \tau, \tau < 1$ preempts the corner solution, $t^* = 1$. I disregard this solution on two grounds: First, extracting the full income of firms on a regular basis is hardly sustainable. Alternatively, $t^* = 1$ might reflect a process of nationalization, but that is something different from protection for tax compliance, nor reflects any of the examples in the literature review. Second, and more importantly, the corner solution is not interesting because it rules out cases in which the capacity to tax of the state is less than perfect, thus excluding even the most advanced economies.

[5]Queralt (2015) considers a less ambitious bargained tax rate. Results hold although they are no longer explicit.

tion upon entry). The threat of liberalizing the economy disciplines the incumbent producer.

I order to evaluate the ruler preference over the *protectionist* and *free entry* regimes, here I focus on the interesting parameter space, that is, the one for which the capacity constraint in (7) binds. Recall, if barriers are not raised, a new firm enters the market with certainty. In this case, wages increase —as they are inversely related to the marginal cost of production—, but tax revenue remains constrained by the stock of fiscal capacity, $t_e^* = \tau$. On the contrary, if barriers are raised, wages remain low but the tax rate is set above the stock of fiscal capacity. Given these alternatives, the ruler must choose between wages or tax revenue. Both cannot rise simultaneously.

Proposition 1. *(Protection for Tax Compliance) Suppose the fiscal capacity constraint in (7) binds, and*

$$\frac{\phi_h}{\phi_l} \leq \delta \tag{9}$$

with $\delta \equiv \frac{[a_1(1+(\rho-1))]^{\frac{1}{\alpha}}}{(a_1(1+\rho-\alpha)-(1-\alpha))(a_1(1-\alpha)+\alpha)^{(1-\alpha)/\alpha}}$. *Then, there exists a* $\hat{\tau} < t_{\lambda=0}$ *such that, for all* $\tau \in [0, \hat{\tau}]$, *a generically unique SPNE exists in which the ruler prefers to adopt entry barriers to free entry. In this equilibrium, the ruler sets* $t_p^* = t_{\lambda=0} > \tau$, *tax revenue increases to* $T(t_p^*, p_p^*, x_p^*|\phi_h) > T(t_e^*, p_e^*, x_e^*|\phi_l)$ *but wages decrease to* $\omega(t_p^*|\phi_h) < \omega(t_e^*|\phi_l)$*; the incumbent firm stays "in" and makes profit* $\pi(t_p^*|\phi_h) < \pi(\tau|\phi_h)$, *while the would-be entrant remains "out".*

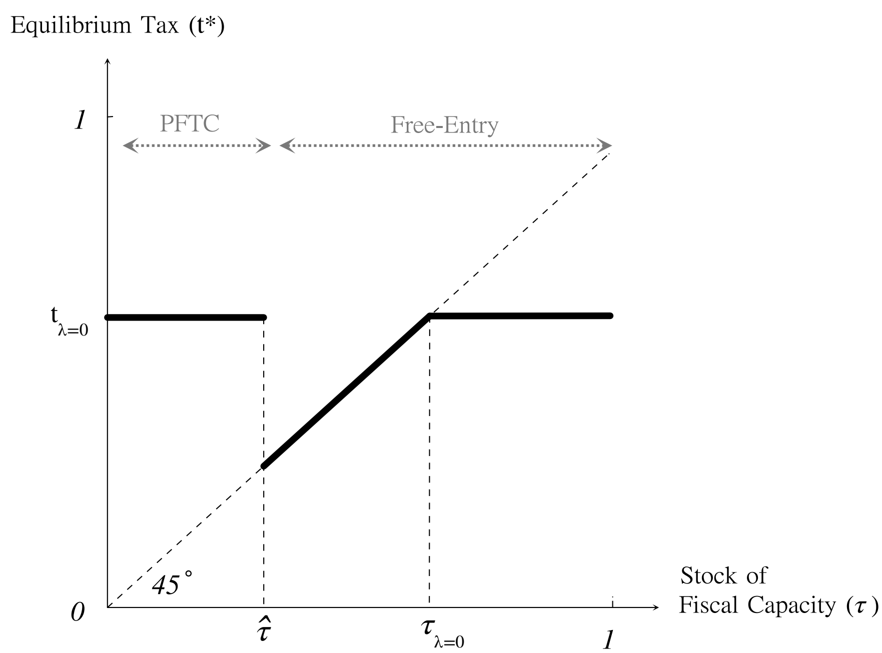
Proof. Denote $V_e(t_e, x^*, \omega^*|\phi_l)$ and $V_p(t_p^*, x^*, \omega^*|\phi_h)$ the ruler's utility under *entry* and *protection*, respectively, as defined in (5), with

$$x_j^* = L\left[\frac{\alpha(1-t)}{\phi_j}\right]^{\frac{1}{1-\alpha}} \tag{10}$$

and ω^* and t_p^* as defined in (3) and (8), respectively. $V_e(t)' > 0$ and $V_e(t)'' < 0$ in $t \in [0, t_{\lambda=0}]$, whereas $V_p(t_p^* = t_{\lambda=0})$ defines a horizontal line in the $t - V$ space. When $\tau \to 0$, $t_e^* \to 0$ and $V_e(t_e^* \to 0)^* = ((1/\alpha)/\alpha)(\alpha/\phi_l)^{(\alpha/(1-\alpha))}$. For $V_e(t_e^* \to 0) < V_p(t_p^*)$, condition (9) is a necessary and sufficient condition. When $\tau \to t_{\lambda=0}$, $t_e^* = t_{\lambda=0}$; for marginal cost $\phi_l < \phi_h$, $V_e(t_e^*) > V_p(t_p^*)$ is always true. Then, by the Intermediate Value Theorem, there is a unique $\hat{\tau}$, $0 < \hat{\tau} < t_{\lambda=0}$ for which $V_e(t_e^* = \hat{\tau}) = V_p(t_p^*)$. For $\tau = \hat{\tau}$ the ruler is indifferent. By assumption, indifference is solved in favor of protection. Altogether, for any $\tau \leq \hat{\tau}$, $V_p(t_p^*) \geq V_e(t_e^*)$, and $V_p(t_p^*) < V_e(t_e^*)$ otherwise. ■

Proposition 1 states that a utilitarian welfare-maximizing ruler finds Protection for Tax Compliance preferable to free entry when fiscal capacity endowment is *sufficiently low* despite the fact that protection blocks the entry of superior technology and pushes both equilibrium demand and wages down. Expression (9) in *Proposition 1* implies that the Protection for Tax Compliance equilibrium may only arise when the technology differential between the incumbent and would-be entrant is not too large. This is consistent with the historical survey of technology adoption conducted by Comin and Hobijn (2009). When the benefits of a new technology are large, no barrier can prevent it from entering. Nevertheless, these circumstances are exceptional. Finally, it is worth mentioning that the right-hand side of expression (9) is increasing in the valuation of public spending ρ, and the weight of labor's well-being in the ruler utility function, a_1. That is, the more valued public good provision and labor's welfare are, the more easily expression (9) is met.

Figure A-1: **Equilibrium Tax Rate and Ruler's Optimal Strategy as a function of the Stock of Fiscal Capacity**



The SPNE in *Proposition 1* is illustrated in Figure A-1. The horizontal axis represents the stock of fiscal capacity τ (or, if preferred, the tax rate at the beginning of the game). Recall, this parameter denotes the maximum share of private income that can be taxed without extortion. The vertical axis represents the equilibrium tax rate (or, if preferred, the final tax rate).

Denote $\tau_{\lambda=0} < 1$ the tax rate that maximizes the utility of the welfare maximizer, the *unconstrained or ideal rate*. For $\tau \leq \hat{\tau}$ the ruler raises entry barriers and, in exchange, sets t_p^* equal to her ideal value, $t_{\lambda=0}$. This parameter space depicts the *protection for tax compliance* equilibrium: in exchange for entry barriers to technology-advanced competitors, the producer abides by the tax rate that maximizes the ruler's indirect utility, which is greater than the stock of fiscal capacity, that is, the maximum tax rate that she would be able to levy by coercive means: $t_p^* = t_{\lambda=0} > \tau$.[6]

Second, for $\tau \in (\hat{\tau}, \tau_{\lambda=0}]$, the ruler prefers *entry* of the technology-advanced competitor, just because the fiscal boost of protectionism does not compensate the opportunity cost of higher wages (and consumption) associated with the new competitive firm. Following entry, the old producer drops (by creative destruction), and the ruler levies $t_e^* = \tau$ on the new firm, thus exhausting fiscal capacity. Notice that, the new firm being already competitive is in no need of entry barriers. Hence, the ruler cannot instrumentalize the threat of Schumpeterian competition to enforce tax rates above the stock of fiscal capacity whenever entry is allowed.

Third, for $\tau \geq \tau(\lambda = 0)$, that is, once the stock of fiscal capacity secures the optimal tax rate by default, the latter remains in equilibrium under free trade. Since building tax administration is costly (Besley and Persson, 2011; Brewer, 1988), we should observe no economy with a stock of fiscal capacity above $\tau_{\lambda=0}$. This segment is plotted for completeness only.

[6] Queralt (2015) shows that the equilibrium holds when t_p^* is set at intermediate values between the stock and the ideal points. The ideal value simplifies algebra and produces an explicit result.

B. Protection for Sale or for Tax Compliance?

Protection is not necessarily for sale. However, oftentimes it is (Grossman and Helpman 1994, Gehlbach 2008, Congleton and Lee 2009). In this particular set up, one may imagine inefficient producers making contributions to the ruler as a means of preventing entry *while keeping taxes low*. This section evaluates such a possibility. In particular, I seek to disentangle when protection might be for sale instead of tax compliance. The criterion I use to differentiate between these two scenarios is simple. Whenever contributions do not prevent the equilibrium tax rate from being set *above* the fiscal capacity endowment, protection is still for tax compliance. That is, contributions might preclude tax rates from reaching the social optimal $t_{\lambda=0}$, but they might still be set above the maximum rate permitted by the stock of fiscal capacity. Formally, $\tau < t^* < t_{\lambda=0}$. If, on the other hand, contributions push the tax rate below the stock of fiscal capacity, then protection is for sale. In that case, $t^* < \tau$, meaning that not only inefficient producers are protected from superior competitors, but they also pay lower taxes than those feasible by the stock of fiscal capacity. In order to disentangle what protection is for, a slight variation in the set up is required.

Extended Set Up

Suppose the technology differential between the new and old technology satisfies condition (9). Accordingly, a welfare utility maximizing ruler would raise entry barriers and set the tax rate equal to the unconstrained rate, $t_p^* = t_{\lambda=0}$. Let's now assume that the ruler is not benevolent. She still cares about labor well-being but she is also responsive to bribes or contributions. Aware of this, the incumbent producer might try to bribe the ruler in order to push down the tax rate while still under the protectionist regime. I rule out by assumption the possibility of the potential entrant to bribe: as he is not yet in the market, he is cash constrained.

To account for political giving by the incumbent elite, the extended set up adds a second stage to the game, in which the producer decides whether to bribe the ruler for such purposes conditional on the latter's preference for protection.[7] Accordingly, I need to include small variations in the objective functions of the ruler and the incumbent producer.

[7] In Appendix C, I evaluate whether contributions can *buy-off* protection when free entry is socially optimal. Those results are similar to the ones in this section. Entry can also be prevented but the bribe that makes that happen is bigger.

Contributions are a form of rent seeking and are not funneled to public spending G. As such, contributions enter the utility function of the ruler but not that of labor. Specifically, the objective function of the ruler once political giving is allowed becomes

$$V(t_c, c) = a_1 u_L(t_c, \phi) + a_2 \pi(t_c) + c(t_c) \tag{11}$$

where $t_c \in [0, t_p]$ denotes the tax rate adopted when contributions $c(t_c)$ are allowed. Again, a_1 and a_2 denote the relative weight attributed to labor's and producer's welfare, respectively.[8] Labor indirect utility u_L is still given by (4) but $\pi(t_c)$ now denotes the *net* profit of the producer

$$\pi(t_c) = \tilde{\pi}(t_c) - c(t_c) \tag{12}$$

with *gross* profit $\tilde{\pi}_c = (1 - t_c)p_c x_c - \phi x_c$, and x_c defined in (10) and $p_c = (L/x_c)^{1-\alpha}$. Lastly, $c(t_c)$ indicates the share of net profit that the producer gives the ruler in order to bring the tax rate t_c below t_p^* *while keeping entry barriers up.*

All else constant, deviating from the benchmark Protection for Tax Compliance equilibrium tax, t_p^*, implies a utility loss for the ruler. If the producer seeks to pay a lower tax rate, he must compensate the ruler for any deviation away from $t_p^* = \tau_{\lambda=0}$. This compensation is exerted through contributions. Contribution c must satisfy two conditions simultaneously. First, c must satisfy the Participation Constraint (PC) of the producer,

$$\tilde{\pi}(t_c) - c(t_c) \geq \pi(t_p^*) \tag{13}$$

where $\pi(t_p^*)$ denotes the profit of the producer under Protection for Tax Compliance, as given by *Proposition 1.* Intuitively, the producer PC states that the net profit of the producer in the case of bribing the ruler must be greater than (or equal to) the profit derived from the pure version of Protection for Tax Compliance, where bribing does not take place and the producer abides to $t_p^* = t_{\lambda=0}$ in exchange for protection.

[8]Results hold if I add a third weight a_3 to $c(t_c)$, such that $a_1 + a_2 + a_3 = 1$.

Second, c must also satisfy the ruler's Incentive Compatibility Constraint (ICC):

$$V(t_c, c) \geq V(t_p^*) \tag{14}$$

That is, the ultimate utility derived by the ruler from $t_c < t_p^*$ and contribution $c > 0$ must be at least as large as the utility derived from the benchmark Protection for Tax Compliance equilibrium as defined by *Proposition 1*.

Altogether, the timing of the extended game remains:

- First, the ruler sets entry and tax policy.
- Then, if barriers are not raised, entry takes place, intermediate good producers compete, and the winner abides by $t_e \leq \tau$.
- If barriers are instead adopted, the producer decides whether to bribe the ruler to push taxes down to $t_c < t_p^*$ at a cost $c(t_c)$. If the producer decides not to bribe, the pure Protection for Tax Compliance exchange follows.
- Given entry and tax policy, tax revenue, wages and net profit follow.

Next I evaluate whether in presence of contributions the ultimate tax rate is ever set above the maximum rate permitted by the stock of fiscal capacity. In other words, I assess whether Protection for Tax Compliance is *bribe-proof.*

Analysis

Suppose Condition (9) is met. In the absence of bribes, the ruler would then follow the pure Protection for Tax Compliance strategy, as characterized in *Proposition 1.* However, in presence of bribes, the ruler might prefer to push taxes down while keeping entry barriers up. For that to be the case, the producer must compensate her for the utility loss of deviating from $t_p^* = t_{\lambda=0}$. The compensation consists of a private contribution $c(t_c)$ funded out of his own profit.[9] I determine the general form of this contribution recognizing that any optimal bribe will be such that it makes the ruler indifferent between the high tax t_p^* and no contribution $c = 0$, and a low tax $t_c < t_p^*$ and positive contribution $c > 0$. This implies the ruler IIC is to be met at equality.

[9] As mentioned in fn.7, Appendix C evaluates whether bribing can prevent entry even if Condition (9) is not met.

Denote the pre-bribe ruler utility $\tilde{V}_c = a_1\big[\omega(t_c) + \rho\bar{G}(t_c)\big] + a_2\pi(t_c)$ so that her total utility becomes

$$V(t_c) = \tilde{V}_c + c$$

I plug this expression into the IIC, set it at equality, and solve for c to establish the general contribution cost function

$$c = \frac{V(t_p^*) - a_1\big[\omega(t_c) + \rho\bar{G}(t_c)\big] - a_2\tilde{\pi}(t_c)}{1 - a_2} \tag{15}$$

with $V(t_p^*)$ defined in *Proposition 1.* Notice that $\partial c/\partial t_c < 0$, meaning that the lower is the tax rate the producer wants to pay upon bribing, the largest share of its profit he must give the ruler to keep her indifferent between the pairs $(t_p^*, c = 0)$ and $(t_c, c > 0)$.

Proposition 2. *Suppose the technology differential between the new and the incumbent producer is low enough to satisfy Condition (9). Given Protection for Tax Compliance tax rate t_p^* defined in Proposition 1, and contribution cost function (15), $a_1 \leq \frac{2-\alpha}{1+\rho}$ is a sufficient condition for bribing to occur. In that case, entry barriers to new competitors are raised and*

$$t_c^* = \begin{cases} \frac{(1-\alpha)(a_1(\rho-1)-1)}{a_1\rho+\alpha-1} & \text{if } a_1 \geq \frac{1}{\rho-1} \\ 0 & \text{otherwise} \end{cases} \tag{16}$$

Given the equilibrium tax rate $t_c^* < t_p^*$, demand for intermediate input $x(t_c^*)$, wages $\omega(t_c^*)$ and net profit $\pi(t_c^*, c(t_c)^*) > \pi(t_p^*, c = 0)$ as defined by (10), (3) and (12) respectively, follow.

Proof. For the ruler ICC and producer PC to be simultaneously satisfied, it must be true that

$$\tilde{\pi}(t_c) - \pi(t_p^*) \geq c \geq V(t_p^*) - \tilde{V}(t_c) \tag{17}$$

with t_p^* defined in *Proposition 1.* I plug the general contribution cost expression (15) into (17). After some rearrangement, I get

$$\tilde{\pi}(t_c) + a_1\Big[\omega(t_c) + \rho\frac{G(t_c)}{L}\Big] \geq \pi_p(t_p^*) + a_1\Big[\omega(t_p^*) + \rho\frac{G(t_p^*)}{L}\Big] \tag{18}$$

The left-hand side (LHS) of (18) is concave in t_c. It has a minimum at $t_c = 0$ and a maximum at

$$t^*_{LHS} = \frac{(1-\alpha)(a_1(\rho-1)-1)}{a_1\rho+\alpha-1} \tag{19}$$

A sufficient condition for (18) to be true is $LHS(t^*_{LHS}) > RHS$. Plugging t^*_{LHS}, t^*_p into (18) I get

$$\left[\frac{a_1(1+\rho-\alpha)-(1-\alpha)}{a_1\rho-(1-\alpha)}\right]^{\frac{\alpha}{1-\alpha}} \geq \frac{a_1(1+\rho)-(1-\alpha)}{a_1(1+\rho-\alpha)-(1-\alpha)}$$

I rearrange the above expression into

$$\left[\frac{a_1(1+\rho-\alpha)-(1-\alpha)}{(a_1\rho-(1-\alpha))^{\alpha}}\right]^{\frac{1}{1-\alpha}} \geq a_1(1+\rho)-(1-\alpha) \tag{20}$$

The RHS of (20) is smaller or equal to 1 whenever $a_1 \leq \frac{2-\alpha}{1+\rho}$. Since LHS of (20) is always greater than one, $a_1 \leq \frac{2-\alpha}{1+\rho}$ is a sufficient condition for (18) being true. In other words, as long as $a_1 \leq \frac{2-\alpha}{1+\rho}$ a bribe exists such that the ruler IIC and the producer PC are simultaneously satisfied. The difference between the LHS and the RHS in (18) is maximized precisely at t^*_{LHS}. Thus, the producer's net profit is also optimized at $t^*_c = t^*_{LHS}$. When $a_1 \leq \frac{2-\alpha}{1+\rho}$ is strictly met, (18) is strictly satisfied too, implying that the profit of the producer upon bribing is strictly larger than in the benchmark Protection for Tax Compliance scenario.

Next, I compare t^*_c and t^*_p. The former is always smaller. To see that, I need to compare both equilibrium values

$$t^*_c = \frac{(1-\alpha)(a_1(\rho-1)-1)}{a_1\rho+\alpha-1} < \frac{a_1\rho-1}{a_1(1+\frac{\rho}{1-\alpha})-1} = t^*_p \tag{21}$$

which reduces to

$$a_1(1-\alpha) < (a_1\rho-1)(1-\alpha)+(a_1\rho+\alpha-1) \tag{22}$$

Since $\alpha > 0$, the RHS of the above expression is always larger than $(a_1\rho-1)(1-\alpha)+(a_1\rho-1)$. As $a_1(1-\alpha) < (a_1\rho-1)(2-\alpha)$, $t^*_c < t^*_p$.

Provided $a_1 \leq \frac{2-\alpha}{1+\rho}$, $a_1 > \frac{1}{\rho-1}$ is necessary for $t^*_c > 0$. This condition is stricter than (6), what reduces the parameter space of non-negative taxation once bribing is permitted. When $a_1 \leq \frac{1}{\rho-1}$, (18) is met and $t^*_c = 0$. To see that, I just have to plug $a_1 = \frac{1}{\rho-1}$ into (19). ■

Proposition 2 states that for bribing to take place the ruler cannot care too much about labor well-being (i.e. $a_1 < \frac{2-\alpha}{1+\rho}$).[10] The capacity of contributions to push down the tax rate under protection also depends on a_1. If the ruler cares very little about labor welfare ($a_1 < \frac{1}{\rho-1}$), the producer can afford a contribution $c > 0$ such that it pushes the equilibrium tax up to 0 - implying no public spending is provided at all in equilibrium.[11]

On the other hand, when the ruler cares moderately about labor well-being ($\frac{2-\alpha}{1+\rho} \geq a_1 \geq \frac{1}{\rho-1}$), the producer can only afford to pay a contribution which pushes the equilibrium tax below the unconstrained rate but not up to 0.[12] The ultimate distance between t_c^* and t_p^* is smaller the more the ruler cares about labor welfare (higher a_1) within the interval, and the more labor value public spending (higher ρ). More generally, the larger these two parameters, the better Protection for Tax Compliance resists political contributions.

For illustration purposes, Figure A-2 plots the ruler's equilibrium strategy for $\frac{2-\alpha}{1+\rho} \geq a_1 > \frac{1}{\rho-1}$ as a function of the stock of fiscal capacity. From *Proposition 1* we know that for any stock of fiscal capacity $\tau > \hat{\tau}$, the ruler prefers to open the economy. In absence of barriers, for $\tau \leq \hat{\tau}$, she prefers to raise barriers and set, in exchange, $t = t_p^* > \tau$. Within this parameter space, she might now receive a positive contribution $c > 0$ from the protected producer, with which the latter seeks to push the equilibrium tax rate t_c^* below $\tau_{\lambda=0}$ —thus deviating from the benchmark Protection for Tax Compliance equilibrium.

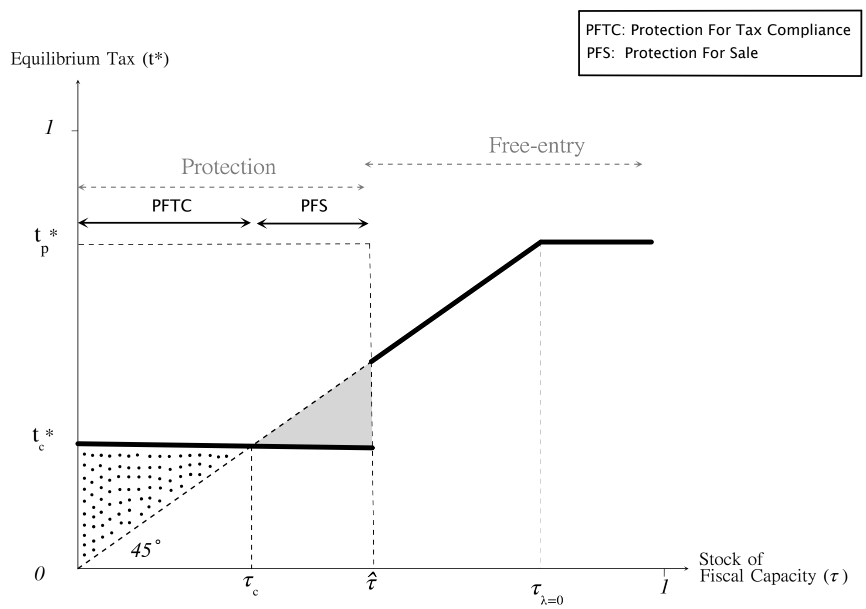
Denote τ_c the value of fiscal capacity for which $t_c^* = \tau$ (i.e. the tax rate for which t_c^* coincides with the highest rate permitted by the stock of fiscal capacity). Then, for any $\tau \in [0, \tau_c]$, the equilibrium tax rate in the presence of contributions is greater than the stock of fiscal capacity, $t_c^* > \tau$. Accordingly, in Figure A-2 the equilibrium tax rate for $\tau \leq \tau_c$ falls above the 45° line. This segment represents the states of the world consistent Protection for Tax Compliance despite contributions. By *Proposition 2*, this segment is increasing in both the value attached by the ruler to

[10]Notice that labor (the consumers) would be better off if bribes were banned. Labor utility as defined in (4) is increasing in the interval $t \in [0, t_p^*]$. Since $t_c^* < t_p^*$, labor well-being is damaged when the ruler accepts a bribe in exchange for pushing the tax rate below the socially optimal level.

[11]Interestingly, bribing is more likely to succeed in capital-intensive sectors, where α is high. When α approaches 1, $\frac{2-\alpha}{1+\rho} \geq a_1 \geq \frac{1}{\rho-1}$ is empty and bribing unravels the Protection for Tax Compliance equilibrium in favor of Protection for Sale (Grossman and Helpman, 1994), in which sectors are protected in exchange for political giving *and* tax rates are set strictly below the stock of fiscal capacity.

[12]Notice that, as long as $a_1 \leq \frac{2-\alpha}{1+\rho}$, the producer's profit is strictly larger than the one he would gain when no contributions are allowed, $\pi(t_c^*, c(t_c)^*) > \pi(t_p^*)$. For this reason producers strongly benefit from bribing *vis-à-vis* taxes.

Figure A-2: Equilibrium Tax Rate and the Ruler's Optimal Strategy when Bribing is allowed and $\frac{2-\alpha}{1+\rho} > a_1 > \frac{1}{\rho-1}$. The equilibrium tax rate is represented with a solid line. The dotted area identifies the interval of the stock of fiscal capacity for which the equilibrium tax rate is above the stock of fiscal capacity. The grey area identifies the values of fiscal capacity endowment for which the equilibrium tax rate is below the fiscal capacity endowment.



labor welfare and labor valuation of public spending. Graphically, when any these two parameters increase, t_c^* moves upwards and expands the interval $\tau \in [0, \tau_c]$, expanding as well the states of the world in which protection comes with higher tax rates than those permitted by the stock of fiscal capacity.

When the stock of fiscal capacity reaches higher levels, $\tau \in (\tau_c, \hat{\tau}]$, Protection for Tax Compliance is no longer feasible. For this parameter space, the equilibrium tax under protection falls below the stock of fiscal capacity ($t_c^* < \tau$) as a result of bribing. Graphically, this implies that the equilibrium tax rate is below the 45° line. This case is consistent with the standard Protection-for-Sale model Grossman and Helpman (1994) as the incumbent producer is protected from competition while the tax rate is lower than the maximum rate permitted by the stock of fiscal capacity.[13]

For completeness, Figure A-2 also plots the ruler's equilibrium strategy for higher values of fiscal capacity endowment, $\tau > \hat{\tau}$. Here, by *Proposition 1* free entry is preferred, and the ruler exhausts the full fiscal capacity of the state, $t_e^* = \tau$. Graphically, the equilibrium tax rate falls

[13]Sonin (2010) offers an example of protection with low taxation as a result of political giving.

along the 45° line up to $t_{\lambda=0}$, the unconstrained tax rate.

To sum up, the extended set up shows that whenever fiscal capacity is sufficiently low and the ruler is not significantly biased toward the producer's interests, not even contributions prevent taxes from being set above the stock of fiscal capacity in exchange for protection from superior competitors. In these states of the world, contributions do push down the equilibrium tax rate but, consistent with the definition of Protection for Tax Compliance, it remains above the stock of fiscal capacity. The states of the world in which protection is paid back with higher tax compliance despite the use of political giving expand when the ruler's valuation for labor's welfare, or the latter's valuation of public spending increase (i.e. the closer we get to the benevolent ruler type).

C. Preventing Liberalization with Political Contributions

From Proposition 1 I know that whenever the technology distance between the old and new producers is very large, $\phi_h/\phi_l > \delta$, opening the economy is socially optimal. In this extension, I evaluate the possibility that the incumbent producer bribes the ruler to avoid (or delay) entry precisely when the technology distance exceeds δ. To that end, I must evaluate whether such a bribe is feasible and what tax would be paid in equilibrium. Once again, as long as the resulting equilibrium tax rate is higher than the highest rate permitted by the stock of fiscal capacity, $t^* > \tau$, Protection for Tax Compliance will hold despite the intermediation of bribing.

As in *Proposition 1* in the main text, the bribe must satisfy the producer participation constraint and the ruler incentive compatibility constraint. The incumbent producer participation constraint now is

$$\tilde{\pi}_c(t_c|\phi_h) - 0 \geq c \tag{23}$$

where $\tilde{\pi}_c(t_c|\phi_h)$ denotes gross profit. The 0 is intentionally reported because it denotes the incumbent producer's reservation utility in case of entry. As Condition (9) in *Proposition 1* is no longer satisfied, entry takes place with certainty in absence of a contribution that prevents it from happening. In case of entry, due to Schumpeterian competition, the old producer would instantaneously drop the market and gain null utility.

The ruler incentive compatibility constraint now becomes

$$\tilde{V}_c(t_c|\phi_h) + c \geq V_e(t_e|\phi_l) \tag{24}$$

where $\tilde{V}_c(t_c|\phi_h)$ denotes the pre-contribution utility of the ruler given $t_c \in [0, t_{\lambda=0}]$, $V_e(t_e|\phi_l)$ the utility she gains upon entry, and marginal cost $\phi_h > \phi_l$.

Once again, the contribution in equilibrium must be one that makes the ruler indifferent between allowing *free entry* (and get not contribution), and raising barriers in exchange for a political contribution. From (24), this implies

$$c = V_e(t_e|\phi_l) - V_c(t_c|\phi_h) = \frac{V_e(t_e|\phi_l) - a_1\left[w_c(t_c|\phi_h) + \rho\frac{G(t_c, x_c^*|\phi_h)}{L}\right] - a_2\tilde{\pi}_c(t_c|\phi_h)}{1 - a_2} \tag{25}$$

with x_c^* defined in (10).

Proposition 3. *Suppose the technology differential between the incumbent and potential entrant is high enough to make free entry preferable in absence of contributions, $(\phi_h/\phi_l) > \delta$, as defined in Proposition 1. For the tax rate upon entry $t_e^* = \tau$ as defined in Proposition 1, and contribution cost function (25), entry barriers are raised as long as technology differential satisfies*

$$\delta < \frac{\phi_h}{\phi_l} < \left[\frac{a_1(1+\alpha(\rho-1))}{a_1\rho - 1 + \alpha}\right]^{\frac{\alpha}{1-\alpha}} \left(\frac{a_1(1+\alpha(\rho-1))}{a_1(1-\alpha)+\alpha}\right) \tag{26}$$

for which the producer pays $c(t_c^*) > 0$ and abides to

$$t_c^* = \frac{(1-\alpha)(a_1(\rho-1)-1)}{a_1\rho - (1-\alpha)} \tag{27}$$

Proposition 3 states that the producer can prevent entry of the superior competitor conditional on paying a positive contribution and provided the technology distance between the two firms is not infinitely larger than δ. If this distance exceeds the RHS of (26), the producer would not be able to afford a contribution big enough to prevent entry. The equilibrium contribution here is larger than the one in Section 3, where the producer used contributions to push tax rates down under protection given that the technology distance between the old and new producer was low. Even though the equilibrium tax rate here is similar than in that case, the first term in the numerator of the contribution cost function (25) is now $V_e(\phi_l)$ instead of $V_p(\phi_h)$, with $V_e(\phi_l) > V_p(\phi_h)$ for $(\phi_h/\phi_l) > \delta$. This implies the producer gains a smaller profit whenever he bribes the ruler to prevent entry despite liberalization is socially optimal.

Since the equilibrium tax rate is the same as in Proposition 2, the states of the world in which Protection for Tax Compliance is compatible with bribing is also the same - and is thus depicted in Figure A-2 in the main text too. Denote $\tau_c = t_c^*$, the stock of fiscal capacity coinciding exactly with the equilibrium tax rate in Proposition 2. Then, for any $\tau \in [0, \tau_c]$, $t_c^* > \tau$, meaning Protection for Tax Compliance holds despite the intermediation of bribes. On the other hand, for any $\tau \in (\tau_c, \hat{\tau}]$, $t_c^* < \tau$, implying that the equilibrium tax rate is set below the maximum tax rate permitted by the stock of fiscal capacity.[14] In that case, protection is given for reason other than tax compliance

[14]Recall, $\hat{\tau}$ is defined in *Proposition 1.*

(i.e. pure rent-seeking).

The proof of Proposition 3 consists of two parts: first I prove that a bribe satisfying the participation constraint (PC) and the incentive compatibility constraint (ICC) simultaneously is feasible. This exercise also gives us the tax rate in equilibrium, as it is the one *bought-off* by the bribe itself. The second part of the proof proves that the bribe is only feasible provided the technology distance between the old producer and the would-be entrant is bounded.

Part 1. The PC and ICC are simultaneously satisfied whenever $\pi_c(t_c|\phi_h) \geq V_e(t_e|\phi_l) - V_c(t_c|\phi_h)$. If I expand this expression, I get

$$\Big[\frac{\alpha}{\phi_h}(1-t_c)\Big]^{\frac{\alpha}{1-\alpha}}\Big((1-t_c)(1-\alpha) - a_1\big(\frac{1-\alpha}{\alpha}+\rho t_c\big)\Big) \geq V_e(t_e,\phi_l) \tag{28}$$

The left hand side (LHS) of this expression (which denotes the net-of-bribing profit of the incumbent producer) is a concave function of t_c, and it is maximized for (27).[15] The right-hand side (RHS) is not a function of t_c. A necessary and sufficient condition for (28) to be satisfied is $LHS(t_c^*) > RHS$. This is true whenever,

$$\frac{\phi_h}{\phi_l} < \Bigg[\frac{a_1(1+\alpha(\rho-1))}{a_1\rho - 1 + \alpha}\Bigg]^{\frac{\alpha}{1-\alpha}}\Big(\frac{a_1(1+\alpha(\rho-1))}{a_1(1-\alpha)+\alpha}\Big) \equiv \hat{\delta} \tag{29}$$

Part 2. We must check that

$$\hat{\delta} > \delta \tag{30}$$

with δ defined in *Proposition 1.* Otherwise, the producer would never be able to *buy-off* protection whenever liberalization is socially optimal. I plug the original values of δ and $\hat{\delta}$ into (30) and simplify in order to achieve

$$\frac{1}{a_1\rho - 1 + \alpha} > \frac{1}{a_1\rho + 1 - \alpha - (1-\alpha)} \tag{31}$$

which is always true for $a_1 \in (0,1)$, $\rho > 1$ and $\alpha \in (0,1)$. This completes the proof of *Proposition 3.*

[15] Recall, the lower t_c, the larger the bribe required to compensate the ruler.

All in all, this extension proves that producers might resort to bribing in order to prevent entry of a superior competitor *even when entry would be socially optimal.* The tax rate paid in this case would be above the stock of fiscal capacity - being thus compatible with Protection for Tax Compliance- only when the stock is low to begin with. This extension also states that entry can only be prevented whenever the technology distance between producers is limited. Otherwise, the obsolete, incumbent producer would not be able to afford a contribution big enough to compensate the ruler for the welfare loss of keeping the competitive producer out of the domestic market.

D. Technological unemployment upon entry

The benchmark model assumes that labor instantaneously adapts to the new technology and always benefit from it. However, it can be argued that labor might not be skilled enough for the new technology or that the new technology is labor-saving. In either case, entry produces *technological unemployment*. This section investigates this effect in the deciding between protection and free entry. The results suggest that, in the presence of technological unemployment, Protection for Tax Compliance is stickier relative to *entry*. This result is consistent with a standard result in international political economy: technological unemployment is politically inconvenient for any ruler maximizing a weighted utility function of producer's and labor's welfare: e.g. elected rulers.

Suppose that the skills of a worker is of two kinds: high or low. Only high-shilled labor, L^h, is capable of operating the new technology. Low-skilled labor, L^l, goes unemployed upon entry, with $L^h + L^l = 1$. The unemployed are assumed to receive an unemployment benefit b that is proportional to labor-clearing wages, $\beta\omega(x,t)$, with ω defined in (3) and $\beta < 1$. Upon entry, the new utility function of the ruler becomes

$$V = a_1\Big[L^h\omega(x,t|\phi_h) + L^l\beta\omega(x,t|\phi_h)) + \rho(G-b)\Big] + a_2\phi(x,t|\phi_h) \tag{32}$$

where $T = tpx$, and $G + b = T$. Thus, the provision of *public* goods (e.g. schools, roads) might decrease in presence of unemployment benefits. Upon some rearrangement, expression (32) remains

$$\begin{aligned} V = &\quad a_1\Big[\omega(x,t|\phi_h)(L^h + \beta(L^l - \rho)) + \rho G\Big] + a_2\phi(x,t|\phi_h) \\ s.t. &\quad t \leq \tau \end{aligned} \tag{33}$$

Let $\psi \equiv (L^h + \beta(L^l - \rho)) < 1$. Then, the unconstrained tax rate that maximizes the new ruler's problem in (33) is

$$t_{\lambda=0,\psi} \equiv \frac{(1-\alpha)(a_1(\rho - \psi + 1) - 1)}{a_1(\rho + 1 - \alpha) - (1-\alpha)} < 1 \tag{34}$$

which differs from the benchmark result in (8) only in the numerator. Since $\psi < 1$, the unconstrained tax rate is greater in the presence of technological unemployment following entry. The reason is straightforward: entry produces unemployment, which is mitigated with benefits that are to be funded through taxation. But when would the ruler prefer to open the economy despite technological unemployment, and when would she prefer to protect the obsolete firm in return for taxation?

Proposition 4. *Suppose the fiscal capacity constraint in (33) binds. Let*

$$\underline{\delta} \equiv \frac{1 + \alpha(\rho - 1)}{\rho\alpha + \psi(1 - \alpha)} \tag{35}$$

be the minimum technology distance between the would-be entrant and the incumbent producer for "entry" to ever be considered by the ruler, and

$$\bar{\delta} \equiv \frac{a_1(1 + (\rho - 1)\alpha)}{a_1(1 + \rho - \alpha) - (1 - \alpha)} \left[\frac{a_1(1 + (\rho - 1)\alpha)}{a_1\psi + \alpha(1 - a_1)} \right]^{\frac{\alpha}{1-\alpha}} \tag{36}$$

be the maximum technology distance the would-be entrant and the incumbent producer for "protection" to ever be considered by the ruler. Provided

$$\underline{\delta} \leq \frac{\phi_h}{\phi_l} \leq \bar{\delta} \tag{37}$$

there exists a $\hat{\tau} < t_{\lambda=0}$ such that, for all $\tau \in [0, \hat{\tau}]$, a generically unique SPNE exists in which the ruler prefers to adopt entry barriers to free entry. In this equilibrium, the ruler sets $t_p^* = t_{\lambda=0} > \tau$, tax revenue increases to $T(t_p^*, p_p^*, x_p^*|\phi_h) > T(t_e^*, p_e^*, x_e^*|\phi_l)$ but wages decrease to $\omega(t_p^*|\phi_h) < \omega(t_e^*|\phi_l, \psi)$; the incumbent firm stays "in" and makes profit $\pi(t_p^*|\phi_h) < \pi(\tau|\phi_h)$, while the would-be entrant remains "out".

The proof is equivalent to Proposition 1's. Importantly, once I allow for technological unemployment, there is a minimum technology differential that the new firm must satisfy for the ruler to even consider its entry. The reason is as follows: the productivity boost that comes with the new firm must be big enough to compensate (in wages) the decrease in public goods (G) caused by the unemployment benefits (b) that follow technological unemployment. In other words, the Protection for Tax Compliance equilibrium is stickier when I account for technological unemployment. If any, it makes the result in Proposition 1 more likely.

E. Relaxing the Monopoly Assumption

Most of the Protection for Tax Compliance examples in the introduction refer to oligopoly markets. Likewise, monopolies might be hard to enforce and effective enforcement might proxy actual existence of state capacity. For one reason or another, it is worth exploring whether Protection for Tax Compliance is actually compatible with an oligopoly market in the intermediate sector. The answer is positive. A full proof can be found in Queralt (2015). That extension shows that the parameter space of Protection for Tax Compliance is greater for an oligopoly than a monopoly. The reason lies in the change of market structure upon entry: oligopoly prices are replaced by monopoly prices. Thus, part of the benefits of the new technology are cancelled by the price rise. This effect implies that Protection for Tax Compliance is preferred in more states of the world when the intermediate market is oligopolistic. The jump from an oligopoly to a fully competitive market is not as straightforward insofar as collective action problems might appear for a larger N. Still, targeted protection such as licenses or peer-monitoring by business associations might suffice to discipline individual firms.

F. Costly and Imperfect Monopoly Enforcement (or inefficient public good provision)

The set up in the core text assumes that the government is capable of enforcing the domestic monopoly at no cost. However, monopoly enforcement requires some degree of bureaucratic capacity, which is itself costly. This cost implies that only a share $\kappa \in [0,1]$ of total revenue actually reaches the final recipient of public spending (i.e. labor). The remaining share, $1-\kappa$, is spent either in public clerks' salaries, customs buildings, or is even captured by corrupt officials. Without loss of generality, $1-\kappa$ can be interpreted as the sunk cost of taxation derived from costly monopoly enforcement. (Notice that this set up serves us to model also inefficiencies in public good provision: net-$G = \kappa G$, with $\kappa < 1$ accounting for such inefficiencies).

Queralt (2015) investigates whether this sunk cost unravels the Protection for Tax Compliance equilibrium. The result show that, as long as the sunk costs of taxation are constrained, $\kappa > \bar{\kappa}$, there is always room for Protection for Tax Compliance. That is, provided that the stock of fiscal capacity is low enough, protecting the inefficient firm in return for higher taxes is preferred to free entry despite the sunk costs of monopoly enforcement that only take place in the protectionist scenario. Importantly, the extension in Queralt (2015) also suggests which sectors should be more prone to strike a Protection for Tax Compliance agreement: those that are easier to tax, that is, those that have higher κ, thus consistent with Gehlbach (2008).

Imperfect monopoly enforcement (i.e. the producer only accrues a share κ of its potential profit as a result of fringe producers operating in the intermediate market) can be modeled in a functionally equivalent fashion. Queralt (2015) shows that, provided that monopoly enforcement imperfections are not pervasive, the Protection for Tax Compliance equilibrium holds.

F.1. Correlation between Monopoly Enforcement Capacity and Fiscal Capacity

Now I focus on the possibility of monopoly enforcement and fiscal capacity being correlated. Besley and Persson (2011) claim that legal and fiscal capacity are correlated. That is, low values of legal capacity κ are associated with low values of fiscal capacity τ. Let $\psi()$ define the link between these two parameters, $\kappa = \psi(\tau)$. That is, for each value of fiscal capacity, there is a corresponding value of legal capacity. From Queralt (2015) we know that there is a value $\bar{\kappa}$ such that for any $\kappa < \bar{\kappa}$ *free entry* is preferred to Protection for Tax Compliance. Then, $\bar{\tau} = \phi^{-1}(\bar{\kappa})$ defines the corresponding minimum stock of fiscal capacity for which the Protection for Tax Compliance equilibrium exists. In other words, $\tau > \bar{\tau}$ is needed for protection to accrue enough revenue to compensate for the loss of real wages.

Now, there are two possibilities: if $\bar{\tau} > \hat{\tau}$, Protection for Tax Compliance is never an equilibrium. Recall, $\hat{\tau}$ defines the highest stock of fiscal capacity for which protection is preferred to *free entry* (details in *Proposition 1*). If $\bar{\tau} < \hat{\tau}$, Protection for Tax Compliance is an equilibrium for any $\tau \in [\bar{\tau}, \hat{\tau}]$.

The model set up does not allow us to sign $\hat{\tau}$ and $\bar{\tau}$. The former is not explicitly defined. Its existence can be proved but an explicit solution one can work with does not exist. The comparison between both critical values also depends on the functional form of $\psi()$. At this point, one can only speculate. If the link between κ and τ is convex, then the existence of a Protection for Tax Compliance equilibrium is less likely. In that case, a small stock of legal capacity would be associated with a higher stock of fiscal capacity, making $\bar{\tau} < \hat{\tau}$ harder to be met. If the link is concave, then the Protection for Tax Compliance equilibrium is more likely to exist. A small value of legal capacity would coexist with an even lower value of fiscal capacity, satisfying $\bar{\tau} < \hat{\tau}$.

The historical evidence suggests that high fiscal capacity was achieved later than the capacity to enforce state-sponsored monopolies, my *narrow* definition of legal capacity.[16] While the capacity to create state-sponsored monopolies characterizes ancient *limited access order societies* (North, Wallis and Weingast, 2009), the *tax state* is a much more recent phenomenon (Schumpeter, 1918), which only accelerated in the last decades of the nineteenth-century and the early twentieth century (Scheve and Stasavage 2010, Tilly 1990). The pervasive use of mercantilism in pre-modern Europe (Ekelund and Tollison 1981, Findlay and O'Rourke 2007, Heckscher 1931) combined with the historical instances of Protection for Tax Compliance discussed in the Introduction of the main text, also imply that effective state-sponsored monopoly protection can be implemented even if fiscal capacity is low. This also applies to the sample of countries I analyze in the empirical section. Take, for instance, Bolivia and Russia. Their capacity to enforce state-sponsored monopolies is

[16] Notice that Besley and Persson (2011) definition of legal capacity is more demanding than this paper's. They refer to market-supporting institutions that improve the operation of private markets, improve the efficiency of resource use, and shape the incentives to accumulate capital (p.103). In this paper, legal capacity refers only to the capacity to enforce state-sponsored monopoly rights.

well proved (Gallo 1988 and Gehlbach 2008, respectively), while both countries, still today, perform poorly in raising modern income taxes (another good proxy of high fiscal capacity). Bolivia had to temporarily repeal these taxes in the 1985 as they were ineffective and distortionary. And Russia's income taxes in 2004 represented 3.5% of its GDP compared, for instance, to 7.9% in the US or 10.6% in the UK (*Collecting Taxes*, US AID 2004).

To sum up, when it comes to the enforcement of state-sponsored monopolies, all evidence suggests that states develop this capacity much earlier than the capacity to raise taxes in large quantities by coercive means alone. One possible reason for this is that, on top of the administrative challenges of building fiscal and legal capacity, fiscal capacity has to deal with massive informational asymmetries to identify the sources of income of the tax subjects (Aidt and Jensen, 2009; Daunton, 2001). Based on this regularity, I expect the link $\psi()$ between fiscal capacity and legal capacity to be concave, if any. That is, low values of fiscal capacity might be compatible with larger values of legal capacity, making $\bar{\tau} < \hat{\tau}$ more likely than the opposite, thus enabling the existence of the Protection for Tax Compliance equilibrium.

G. Data sources

The unit of observation in the empirical analysis is the two-digit industry as classified by the International Standard Industrial Classification *ISIC* Revision 3.1. Variables are drawn from three different data sources, as reported in the main text: the *World Business Environment Survey* (WBES), the *UNCATDs TRAINS data system*, and the *USAID Fiscal Reform and Economic Governance Project.*

The WBES surveys are representative of the industrial population of the countries considered. The firm-level distribution of the cleaned WBES sample is reported in Table A-1. Each firm is classified in one of the two-digit extractive and manufacturing ISIC industries (26 in total). For each industry, I compute representative measures for all variables. The full list of countries included in the analysis is: Albania, Argentina, Armenia, Belarus, Bolivia, Bulgaria, Chile, Colombia, Croatia, Czech Republic, Ecuador, El Salvador, Estonia, Georgia, Guatemala, Hungary, Kazakhstan, Latvia, Lithuania, FYR Macedonia, Mexico, Moldova, Nicaragua, Peru, Poland, Romania, Russia, Slovak Republic, Slovenia, Turkey, Ukraine, and Uruguay. Data for EE and FSUR are drawn from the 2005 WBES, and Data for LA are drawn from the 2006 WBES.

To guarantee that the protection data is contemporaneous with the other industry data, tariff figures are dated for 2005 for the EE and FSUR sample, and 2006 for the LA sample. Average industry-level obsolescence and labor-weighted tax compliance are explained in full detail in the main text. Industry-level average *age* and *total labor* are self-explanatory. *Export share* denotes the share of total industry revenue stemming from exports. Industry-level labor, age and exports measures have long right tails. I apply a log transformation to the three variables. The *Share of public firms per industry* is computed step-wise. First, I declare as state-owned any firm with more than 50% of its capital owned by the state (or local authority). Then, I compute the share of state-owned firms by industry. All firms are asked to state the number of competitors they face in the market. Respondents must choose among different categories: from category 0 (no competitor) to category 3 (more than 5 competitors). This information is eventually picked up by the industry-level *Competitors* variable. The number of competitors presents missing values in both sub-samples. Yet, I decided not to drop firms with missing values for this variable as long as other firms in the same two-digit industry and country report non-negative values. I take advantage of the symmetry of competition within industries to compute a meaningful measure of market structure even in presence of missing values for this variable. This coding strategy maximizes the number of firms whose values for *all other* variables are non-missing. The distribution of all industry-level measures is reported in Table A-1.

The ISIC Rev.3.1 industrial classification is used both by the WBES and the *UNCATD's TRAINS system* tariff dataset. That is precisely the identifier that allows us to match both datasets at the two-digit industry level. Once the industry-level database is armed, all industries are assigned the fiscal capacity value corresponding to their home country. The data source for the fiscal capacity values and the ratio of tax revenue to GDP are drawn from the *USAID Fiscal Reform and Economic Governance Project.* The *fiscal capacity* proxy, tax staff working in the tax administration, is recorded for 2007 for all countries except Armenia (2008), Belarus (2008), Colombia (2004), Ecuador (2004), Georgia (2004), Guatemala (2004), Kazakhstan (2009) and Nicaragua (2004). The lumpiness of fiscal capacity data justifies the use of the non-contemporaneous data points for this variable. The final unbalanced panel includes 378 industry-countries.

H. Summary statistics and Residuals

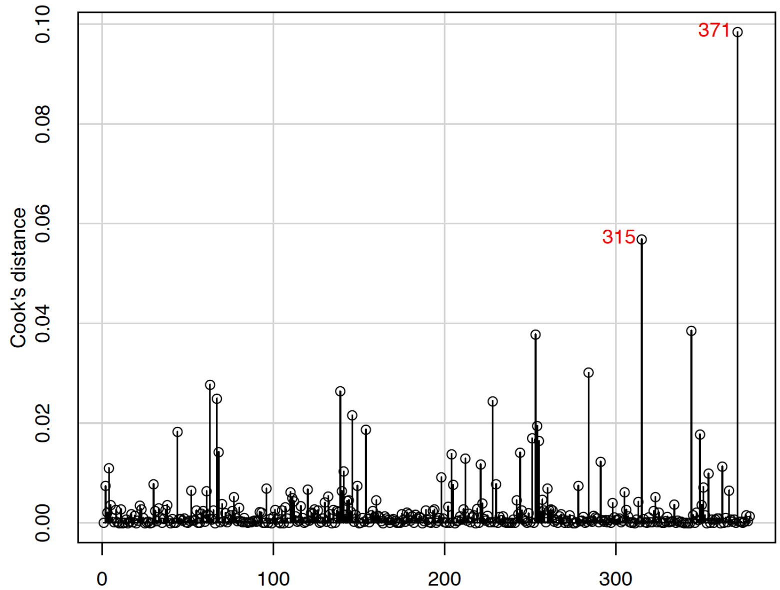
This section includes the descriptive statistics of all variables by the level of measurement, and the residuals' Cook's distance of column 4 in Table 1 in the main text. The only remarkable value in Table A-1 is an AVE tariff value of 97 points. This is clearly an outlier, but it is not influential (it is not any of the two outliers in Figure A-3). If I drop this case from the sample, results in Table 1 in the main text do not change.

Table A-1: **Summary statistics**

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Firm-Level (N=7348)				
Tax Compliance	0.827	0.275	0	1
ln(Age)	2.775	0.763	0	5.283
ln(Employees)	3.33	1.339	1.099	8.294
Export share	13.475	27.257	0	100
State-Owned	0.017	0.13	0	1
ISO certificate	0.179	0.383	0	1
Industry-Level Averages (N=378)				
Weighted Tax Compliance	0.892	0.144	0.2	1
Tax Compliance	0.875	0.137	0.2	1
ln(1 + Export Share)	2.393	1.446	0	4.595
Competitors	2.321	0.63	0	3
ln(Age)	2.887	0.565	1.609	4.554
ln(Labor)	5.875	1.906	1.099	10.2
State-Owned Share	7.003	20.495	0	100
Obsolete	0.797	0.271	0	1
Tariff	5.833	7.225	0	97.790
Avg. Foreign Tariff	5.841	4.448	0	40.118
Country-Level (N=32) and Fixed Effects				
Tax Staff	0.853	0.471	0.050	2.170
Tax to GDP	0.245	0.076	0.104	0.368
VAT to GDP	0.081	0.024	0.028	0.148
Free Media	0.562	0.201	0.12	0.84
ln(Population)	16.112	1.268	14.113	18.779
Region FE	1.14	0.348	1	2
Sector FE	4.963	2.53	1	8
Mining FE	0.058	0.234	0	1

Weighted tax compliance is computed using the share of firm's employees to total industry's labor as the weighting factor. An example: Suppose two firms operate in industry j. One hires 70% of total labor in industry j and complies with 20% of taxes. The other firm hires 30% of total labor in that same industry and complies with 90% of taxes. The weighted tax compliance value for industry j is 20 .7 + 90 .3 = 41%. To prevent results being driven by any extreme value in

Figure A-3: **Influential Outliers based on an unclustered version of Model 4 in Table 1 in the main text.** Observations no. 315 and 371 have high Cook's distances.



the weighting factor, the original firm-level labor variable is winsorized at the 1- and 99-percentile.

Column 4 in Table 1 re-runs column 3 specification in that same table without two outliers. To identify influential outliers, I compute the Cook's distance of the residuals based on an unclustered version of column 3 specification in Table 1 in the main text. Figure A-3 plots the results. Two observations (id. #315 and 371) have large Cook's distance values. These are the two cases dropped in column 4 of Table 1 in the main text.

I. Tax Staff, a proxy of Fiscal Capacity

A potential concern about the size of the tax administration is that this bureau may be used as a form of public employment and patronage. Figure 1 in the main text suggests that there is a positive relationship between the size of the tax administration and total tax revenue. This result is hardly reconciliable with the tax administration being used for patronage. Still, next I explore additional correlations to advance this conclusion.

One might suspect that total tax revenue confounds tax- and non-tax-handles. To address this concern, I correlate the size of the tax administration (normalized to total population), or *Tax Staff*, to Income Tax Yields as a percentage of GDP. Income taxes are said to be the most sophisticated tax, and thus indicate hight fiscal capacity. Unlike *Tax Staff*, however, income tax yields vary with the economic cycle. Figure A-4 show that the relationship between tax staff and this sophisticated tax type is positive.

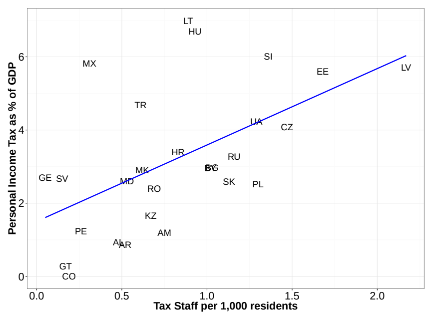
In *State Weakness Index in the Developing World*, Rice and Patrick (2008) rely on the *Government Effectiveness Index* available in World Governance Indicators (2015) to proxy state capacity. *Government Effectiveness* measures the "quality of public services, the quality of the civil service and *the degree of its independence from political pressures*, the quality of policy formulation and implementation, and the credibility of the governments commitment to such policies." (italics added). Figure A-4 shows that this index is positively correlated with the size of the tax administration.

The positive correlation of this index and tax staff, combined with the positive correlation with fiscal outcomes (both total and income tax yields) suggests, first, that the tax staff is a good proxy of the extractive capacity of the state, and second, that the tax administration is *not* systematically used as source of public employment.

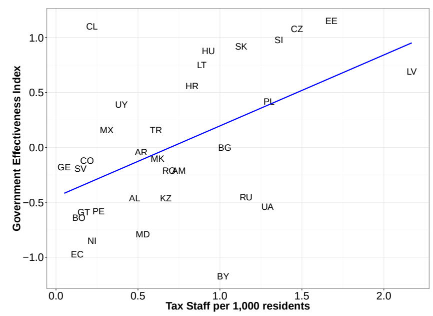
We can analyze the predictive power of the size of the tax administration on tax evasion. In the absence of crossnational data on tax evasion, Figure A-4 plots the correlation between the size of the shadow economy (Schneider, Buehn and Montenegro, 2010) and the size of the tax administration. The correlation is negative, as one would expect if *Tax Staff* truly captures the capacity to raise taxes.

Finally, we can test how well the size of the tax adminstration predicts tax compliance in the data at hand. To this end, Figure A-4 shows the correlation of *Tax Staff* and country-average tax compliance based on the +7,000 firms in the sample. Both variables correlate positively.

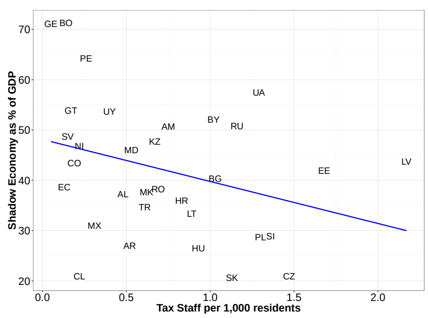
Figure A-4: **Correlates of Tax Staff**



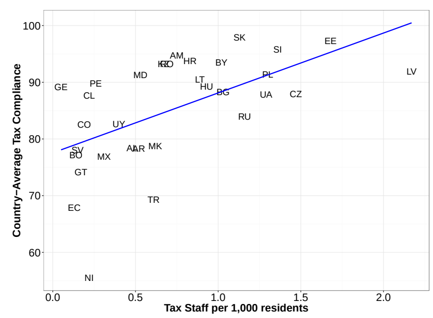
(a) Income Tax to GDP



(b) Government Effectiveness



(c) Shadow Economy



(d) Average Tax Compliance

J. Country-level Confounders

Column 5 in Table 1 in the main text include country fixed effects. This should be convincing enough in terms of addressing country-level omitted variable bias. Still, one might prefer to replace country fixed effect by covariates that correlate with tax compliance, protection and industry obsolescence. To this end, Table A-2 includes various covariates that account for levels of economic development (GDP/Cap and Urbanization), industrial development (gross capital formation and industry weight for the national economy), state capacity (proxied by primary schooling enrollment, military spending to GDP, and state antiquity (Putterman, 2007)), even ethnic fractionalization, which is expected to inhibit fiscal capacity investment (Besley and Persson, 2011). The main coefficients of interest, $\hat{\beta}_7$, remains virtually unchanged across specifications.

Table A-2: **Models of Industry-Level Tax Compliance with Additional Country-Level**

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\hat{\beta}_1$:	Low Fiscal Capacity	0.057	0.050	0.046	0.086	0.054	0.042	0.086	0.060
		(0.074)	(0.071)	(0.070)	(0.068)	(0.070)	(0.070)	(0.051)	(0.072)
$\hat{\beta}_2$:	Tariff	-0.026**	-0.028**	-0.029**	-0.029**	-0.032**	-0.030**	-0.029**	-0.030**
		(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)
$\hat{\beta}_3$:	Obsolete	-0.164**	-0.178**	-0.181**	-0.198**	-0.195**	-0.183**	-0.174**	-0.204**
		(0.079)	(0.087)	(0.086)	(0.081)	(0.086)	(0.086)	(0.083)	(0.087)
$\hat{\beta}_4$:	Obsolete×Tariff	0.027**	0.029**	0.029**	0.031**	0.032**	0.030**	0.030**	0.031**
		(0.011)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.014)
$\hat{\beta}_5$:	Low Fiscal Capacity×Tariff	-0.022**	-0.023**	-0.023**	-0.024**	-0.026**	-0.024**	-0.024**	-0.024**
		(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
$\hat{\beta}_6$:	Low Fiscal Capacity × Obsolete	-0.115*	-0.116	-0.119*	-0.141**	-0.133*	-0.117	-0.110	-0.139**
		(0.065)	(0.070)	(0.070)	(0.062)	(0.069)	(0.070)	(0.066)	(0.068)
$\hat{\beta}_7$:	Low Fiscal Capacity×Obsolete×Tariff	0.022**	0.022**	0.022**	0.024**	0.025**	0.023**	0.023**	0.024**
		(0.009)	(0.010)	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)	(0.010)
$\hat{Z}_1$:	ln(1+Export Share)	-0.003	-0.002	-0.003	-0.002	-0.003	-0.003	-0.000	-0.004
		(0.006)	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
$\hat{Z}_2$:	Competitors	-0.014	-0.014	-0.014	-0.010	-0.014	-0.013	-0.012	-0.014
		(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
$\hat{Z}_3$:	ln(Age)	0.005	0.007	0.007	0.006	0.006	0.006	0.014	0.003
		(0.012)	(0.012)	(0.013)	(0.011)	(0.012)	(0.012)	(0.013)	(0.013)
$\hat{Z}_4$:	ln(Labor)	0.015**	0.015**	0.015**	0.014**	0.015**	0.015**	0.013**	0.015**
		(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.006)	(0.007)
$\hat{Z}_5$:	State-Owned Share	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$\hat{Z}_6$:	Population	-0.017	-0.015	-0.013	-0.016	-0.015	-0.015	0.001	-0.015
		(0.012)	(0.012)	(0.014)	(0.010)	(0.012)	(0.012)	(0.009)	(0.011)
$\hat{Z}_7$:	Free Media	-0.109*	-0.057	-0.054	-0.003	-0.082	-0.059	0.023	-0.076*
		(0.058)	(0.049)	(0.056)	(0.049)	(0.066)	(0.055)	(0.063)	(0.042)
	GDP/Cap	0.027							
		(0.018)							
	Urban Population		0.001						
			(0.001)						
	Gross Capital Formation to GDP			0.000					
				(0.003)					
	Industry Value-Added to GDP				0.004***				
					(0.002)				
	Primary Education Enrollment					0.002			
						(0.002)			
	Military Spending to GDP						0.011		
							(0.010)		
	State Antiquity							-0.027**	
								(0.011)	
	Ethnic Fractionalization								-0.105*
									(0.051)
$\hat{\beta}_0$:	Intercept	1.143***	1.263***	1.260***	1.193***	1.298***	1.273***	1.225***	1.382***
		(0.191)	(0.174)	(0.277)	(0.138)	(0.161)	(0.173)	(0.166)	(0.165)
	Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Sector FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Observations	376	376	376	376	376	376	376	376
	R-squared	0.229	0.223	0.220	0.250	0.223	0.224	0.250	0.232

The two outliers identified in column XXX in Table XXX are not considered. Country-clustered standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Data for GDP/Cap, Urban Population, Gross Capital Formation, Industry Value-Added, Primary Education and Military Spending drawn from World Bank (2016). State Antiquity Index drawn from Putterman (2007), and Ethnic Fractionalization drawn from Alesina et al. (2003).

K. Algebra for 2-level Random-intercept, Random-Slope Hierarchical Model

The two-level hierarchical model in column 6 of Table 1 in the main text allows the coefficient of protection and obsolescence and their interaction to vary by the level of fiscal capacity. The specification is as follows: denote x_{jk} the obsolescence of industry j in country k, z_{kj} the tariff level, and w_k the reversed level of fiscal capacity capacity in country k (recall, *Low Fiscal Capacity (LFC)* $= -1 \times$ *Fiscal Capacity*), M_{jk} a vector of industry-level controls, and ρ a battery of fixed effects (e.g. the region fixed effect). Then, the random-intercept, random-coefficient hierarchical model to estimate is:

$$
\begin{aligned}
\text{tax compliance}_{jk} &= \beta_{0k} + \beta_{1k}x_{jk} + \beta_{2k}z_{jk} + \beta_{3k}x_{jk}z_{jk} + M_{jk} + \rho + r_{jk} \\
\text{with} & \\
\beta_{0k} &= \gamma_{00} + \gamma_{01}w_k + u_{0k} \\
\beta_{1k} &= \gamma_{10} + \gamma_{11}w_k + u_{1k} \\
\beta_{2k} &= \gamma_{20} + \gamma_{21}w_k + u_{2k} \\
\beta_{3k} &= \gamma_{30} + \gamma_{31}w_k + u_{3k}
\end{aligned} \tag{38}
$$

where r_{jk} and u_{ik} denote level-1 and 2 residuals, respectively. Upon substitution, the model becomes

$$
\begin{aligned}
\text{tax compliance}_{jk} &= \gamma_{00} + \gamma_{01}w_k + \gamma_{10}x_{jk} + \gamma_{20}z_{jk} \\
&+\gamma_{30}x_{jk}z_{jk} + \gamma_{11}w_kx_{jk} + \gamma_{21}w_kz_{jk} + \gamma_{31}w_kx_{jk}z_{jk} \\
&+u_{1k}x_{jk} + u_{2k}z_{jk} + u_{3k}x_{jk}z_{jk} + u_{0k} + r_{jk} \\
&+M_{jk} + \rho
\end{aligned} \tag{39}
$$

where the full battery of cross-level interactions (the fixed component) is followed by five random effects and controls.

L. Firm-level Analysis

L.1. Non-Response Bias

Jensen et al. (2010) find that firms in countries with less press freedom are more likely to provide nonresponse on sensitive issues, among which we can expect tax compliance to apply. 7.68% of the +7,000 sampled firms do not respond to the tax compliance question. To address Jensen et al.'s (2010) considerations, I model response as a function of baseline controls and the *Media Freedom* index built by the Freedom House. Results are reported in Table A-3, where I also control the level of democracy as measured by the Polity IV variable. These variables do not predict non-response. Still, following Jensen et al. (2010) recommendation, I control for the level of free media in every industry-level model.

Desai and Olofsgård (2011) address non-response issues from a different angle: they compute inverse probability weights drawn from a logistic regression model that estimate the probability of response of tax compliance as a function of baseline information. I follow this approach by using column 2 in Table A-3 to compute inverse probability weights. These are then incorporated into the models reported in Appendix Table A-4 (OLS models) and A-5 (HLM). The OLS models control for two-digit industry FE, while the HLM fit random intercepts at the two-digit industry and country-level. Columns 1 and 2 in both Tables compare the effect of adjusting for non-response weighting in firm-level models of tax compliance. Results are virtually identical.

Table A-3: **Response to Tax Compliance Item as a Function of Institutional and Political Characteristics and Baseline Controls.**

	(1) Probit	(2) Probit	(3) Probit
Free Media		-1.193	
		(0.789)	
Polity IV			-0.126
			(0.101)
ln(Age)	-0.009	0.002	0.002
	(0.044)	(0.046)	(0.045)
ln(1+Export Share)	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)
ln(Labor)	0.032	0.031	0.026
	(0.028)	(0.029)	(0.031)
State-Owned Share	0.078	0.031	0.071
	(0.280)	(0.286)	(0.306)
Competitors	0.458**	0.530***	0.504***
	(0.203)	(0.197)	(0.190)
Obsolete	-0.068	-0.082	-0.075
	(0.082)	(0.085)	(0.083)
Fiscal Capacity	0.503	0.585	0.743
	(0.633)	(0.549)	(0.554)
Tariff	0.028	0.010	0.019
	(0.018)	(0.014)	(0.018)
ln(Population)	0.184	0.128	0.152*
	(0.112)	(0.107)	(0.086)
Constant	-2.090	-0.591	-0.755
	(1.432)	(1.535)	(1.373)
Region FE	Yes	Yes	Yes
Two-digit Sector FE	Yes	Yes	Yes
Observations	7,619	7,619	7,619

Country-Clustered standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

L.2. Firm-Level Systematic Bias

Firms perceive economic context, in general, and taxation, in particular, in different ways, causing firm-specific bias. Following Desai and Olofsgård (2011), I size firm-specific bias by using the residuals of regression models of objective country performance on firm performance. Accordingly, I regress responses by managers to a question about the severity of macroeconomic instability on the inflation rate in the country during the survey year —a proxy for actual macroeconomic instability—plus sector- and country-fixed effects. The residuals from this model are interpreted as the the extent to which within-country, within-industry perceptions of macroeconomic instability are not influenced by price instability: namely, the firm-specific bias. Column 3 in Tables A-4 (OLS) and A-5 (HLM) include these residuals to control for firm-specific bias. Results hold.

Hallward-Driemeier and Aterido (2009) argue that *size* and *performance* are the two strongest predictors of *perceived* severity of taxation. The baseline specifications already control for the size of the firm. Here, I control for firm performance too, and in doing so, I follow Hallward-Driemeier and Aterido (2009): that is, I approximate performance by considering *employment growth* within the last three years. Responses are collapsed in three categories: contraction, constant, expansion. Column 4 in Tables A-4 (OLS) and A-5 (HLM) include these dummies as an alternative measure of firm-specific bias. Results hold.

Third, the *WBES* includes three items that approximate how burdening the tax system may be perceived by the firm managers that fill the questionnaire: one is behavioral (having been inspected by a tax official within the last year), two are qualitative: considering tax rates as the major obstacle to business, and the tax administration as the major obstacle to business. Columns 5-7 in Tables A-4 (OLS) and A-5 (HLM) include these indicators as measures of firm-specific bias. Results hold.

Overall, Tables A-4 and A-5 suggests that results are robust to alternative measures of firm-specific bias and non-response weighting. Importantly, this analysis confirms that the industry-level results in the main text are not driven by ecological fallacy, non-response bias or firm-specific bias.

Table A-4: **OLS Models of Firm-Level Tax Compliance as a function of firm-, sector- and country-characteristics**

	Non-Response Weighting†	No (1)	Yes (2)	Yes (3)	Yes (4)	Yes (5)	Yes (6)	Yes (7)
$\hat{\beta}_1$:	Low Fiscal Capacity	-0.063*	-0.058	-0.064*	-0.060	-0.062	-0.055	-0.058
		(0.036)	(0.038)	(0.037)	(0.037)	(0.037)	(0.040)	(0.038)
$\hat{\beta}_2$:	Tariff	-0.007	-0.008*	-0.007*	-0.008*	-0.007	-0.007	-0.007
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$\hat{\beta}_3$:	Obsolete	-0.024	-0.021	-0.017	-0.025	-0.016	-0.021	-0.024
		(0.021)	(0.022)	(0.020)	(0.027)	(0.022)	(0.022)	(0.023)
$\hat{\beta}_4$:	Obsolete×Tariff	0.005*	0.004*	0.004*	0.004	0.004	0.004	0.004
		(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
$\hat{\beta}_5$:	Low Fiscal Capacity×Tariff	-0.007*	-0.007*	-0.007*	-0.007*	-0.006	-0.007*	-0.006
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$\hat{\beta}_6$:	Low Fiscal Capacity × Obsolete	-0.030	-0.031	-0.026	-0.033	-0.026	-0.030	-0.034
		(0.024)	(0.026)	(0.025)	(0.029)	(0.026)	(0.026)	(0.027)
$\hat{\beta}_7$:	Low Fiscal Capacity×Obsolete×Tariff	0.006**	0.006**	0.006**	0.006**	0.006**	0.006**	0.006**
		(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)
$\hat{Z}_1$:	ln(1+Export Share)	-0.000	0.000	-0.000	0.000	0.000	0.000	0.000
		(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
$\hat{Z}_2$:	Competitors	0.065**	0.093**	0.092**	0.095**	0.092**	0.092**	0.098**
		(0.030)	(0.038)	(0.037)	(0.038)	(0.037)	(0.036)	(0.038)
$\hat{Z}_3$:	ln(Age)	0.002	0.003	0.004	0.002	0.003	0.002	0.002
		(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)	(0.007)
$\hat{Z}_4$:	ln(Labor)	0.022***	0.022***	0.021***	0.025***	0.021***	0.023***	0.023***
		(0.005)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.006)
$\hat{Z}_5$:	State-Owned Share	0.011	0.013	0.013	0.012	0.013	0.016	0.011
		(0.025)	(0.029)	(0.030)	(0.029)	(0.028)	(0.030)	(0.030)
$\hat{Z}_6$:	ln(Population)	-0.007	-0.005	-0.006	-0.005	-0.003	-0.005	-0.004
		(0.013)	(0.014)	(0.013)	(0.014)	(0.014)	(0.013)	(0.014)
$\hat{Z}_7$:	Free Media	-0.074	-0.076	-0.076	-0.077	-0.069	-0.078	-0.082
		(0.060)	(0.061)	(0.061)	(0.061)	(0.060)	(0.063)	(0.061)
	Residual of Macroeconomic Instability			0.008				
				(0.006)				
	Same Performance				0.025**			
					(0.011)			
	Higher Performance				-0.004			
					(0.010)			
	Inspected					0.021*		
						(0.011)		
	Tax Rates Being Major Obstacle						0.008	
							(0.008)	
	Tax Administration Being Major Obstacle							-0.006
								(0.006)
$\hat{\beta}_0$	Intercept	0.810***	0.709**	0.717***	0.694**	0.662**	0.701**	0.701**
		(0.260)	(0.267)	(0.260)	(0.279)	(0.272)	(0.265)	(0.274)
	Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Two-digit Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Observations	7,334	7,016	6,901	6,834	6,993	6,963	6,916
	R-squared	0.071	0.070	0.069	0.072	0.072	0.070	0.070

†For Non-Response Weighting refer to Appendix L1. Country-clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A-5: **Random-Intercept Hierarchical-Linear Models of Tax Compliance, where firms (level 1) are nested into two-digit industries (level 2) that are nested into countries (level 3)**

Non-Response Weighting†	No (1)	Yes (2)	Yes (3)	Yes (4)	Yes (5)	Yes (6)	Yes (7)
Fixed Effects							
$\hat{\beta}_1$:Low Fiscal Capacity	-0.039	-0.038	-0.044	-0.040	-0.041	-0.038	-0.037
	(0.031)	(0.031)	(0.031)	(0.032)	(0.031)	(0.031)	(0.032)
$\hat{\beta}_2$:Tariff	-0.006**	-0.007***	-0.007***	-0.006**	-0.006**	-0.006**	-0.006**
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
$\hat{\beta}_3$:Obsolete	-0.017	-0.015	-0.010	-0.017	-0.011	-0.015	-0.018
	(0.021)	(0.021)	(0.019)	(0.027)	(0.020)	(0.021)	(0.021)
$\hat{\beta}_4$:Obsolete×Tariff	0.003	0.002	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
$\hat{\beta}_5$:Low Fiscal Capacity×Tariff	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$\hat{\beta}_6$:Low Fiscal Capacity × Obsolete	-0.017	-0.015	-0.010	-0.018	-0.013	-0.015	-0.018
	(0.021)	(0.023)	(0.022)	(0.027)	(0.023)	(0.023)	(0.023)
$\hat{\beta}_7$: Low Fiscal Capacity×Obsolete×Tariff	0.005**	0.004*	0.004*	0.004*	0.004*	0.004*	0.004*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$\hat{Z}_1$:ln(1+Export Share)	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$\hat{Z}_2$:Competitors	-0.010	-0.003	-0.003	-0.002	-0.004	-0.003	-0.002
	(0.012)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.014)
$\hat{Z}_3$:ln(Age)	0.010*	0.010*	0.012**	0.009	0.010*	0.010	0.010
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)
$\hat{Z}_4$:ln(Labor)	0.018***	0.018***	0.017***	0.021***	0.018***	0.018***	0.018***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
$\hat{Z}_5$:State-Owned Share	0.005	0.000	0.000	-0.001	0.000	0.002	-0.003
	(0.022)	(0.027)	(0.028)	(0.028)	(0.027)	(0.028)	(0.028)
$\hat{Z}_6$: ln(Population)	-0.008	-0.007	-0.008	-0.008	-0.007	-0.008	-0.006
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
$\hat{Z}_7$: Free Media	-0.043	-0.036	-0.039	-0.036	-0.031	-0.039	-0.038
	(0.064)	(0.066)	(0.064)	(0.067)	(0.065)	(0.065)	(0.066)
Residual of Macroeconomic Instability			0.007				
			(0.006)				
Same Performance				0.028**			
				(0.012)			
Higher Performance				-0.001			
				(0.008)			
Inspected					0.009		
					(0.011)		
Tax Rates Being Major Obstacle						0.005	
						(0.006)	
Tax Administration Being Major Obstacle							-0.007
							(0.005)
$\hat{\beta}_0$: Intercept	0.998***	0.961***	0.970***	0.948***	0.941***	0.962***	0.957***
	(0.208)	(0.209)	(0.204)	(0.219)	(0.214)	(0.205)	(0.213)
Random Effects							
$\sigma_{country.intercept}$	0.070	0.069	0.068	071	0.069	0.069	0.071
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
$\sigma_{industry.intercept}$	0.024	0.027	0.027	0.025	0.027	0.027	0.027
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.005)
$\sigma_{residual}$	0.256	0.262	0.262	0.261	0.262	0.262	0.261
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Region FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log-Likelihood	-490.0	-692.4	-662.9	-628.8	-686.3	-668.6	-650.1
Level-1 units	32	32	32	32	32	32	32
Level-2 units	26	26	26	26	26	26	26
Level-3 units	7,334	7,016	6,901	6,834	6,993	6,963	6,916

†For Non-Response Weighting refer to Appendix L1. Country-clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

L.3. Joint Country-Sector Fixed Effect Models

In order to challenge threats to identification, Table A-6 fits sector, sector and country, and country-sector fixed effects to firm-level models of tax compliance. Results hold across specifications, including the country-sector FE model, which consumes 32X8 degrees of freedom. $\hat{\beta}_7$ holds the expected sign and is statistically different from zero. That is, in contexts of low fiscal capacity, keeping within country-sector variation constant, obsolete firms that are granted protection from competition are more tax compliant.

Table A-6: **Firm-Level Models of Tax Compliance with Country-Sector Fixed Effects**

		(1)	(2)	(3)
$\hat{\beta}_1$:	Low Fiscal Capacity	-0.091***	0.086***	-0.177***
		(0.028)	(0.025)	(0.033)
$\hat{\beta}_2$:	Tariff	-0.009*	-0.005**	-0.007**
		(0.005)	(0.002)	(0.004)
$\hat{\beta}_3$:	Obsolete	-0.028	-0.015	-0.012
		(0.021)	(0.022)	(0.020)
$\hat{\beta}_4$:	Obsolete×Tariff	0.005**	0.002	0.002
		(0.002)	(0.003)	(0.002)
$\hat{\beta}_5$:	Low Fiscal Capacity×Tariff	-0.008**	-0.006**	-0.009**
		(0.004)	(0.002)	(0.004)
$\hat{\beta}_6$:	Low Fiscal Capacity × Obsolete	-0.031	-0.016	-0.010
		(0.024)	(0.024)	(0.021)
$\hat{\beta}_7$:	Low Fiscal Capacity×Obsolete×Tariff	0.007**	0.004*	0.004*
		(0.003)	(0.002)	(0.002)
$\hat{Z}_1$:	ln(1+Export Share)	-0.000	0.000	0.001
		(0.004)	(0.004)	(0.003)
$\hat{Z}_2$:	Competitors	0.049	-0.008	-0.028**
		(0.031)	(0.013)	(0.012)
$\hat{Z}_3$:	ln(Age)	-0.001	0.010	0.010*
		(0.007)	(0.006)	(0.006)
$\hat{Z}_4$:	ln(Labor)	0.024***	0.019***	0.018***
		(0.005)	(0.004)	(0.004)
$\hat{Z}_5$:	State-Owned Share	0.020	0.003	0.013
		(0.025)	(0.023)	(0.024)
$\hat{Z}_6$:	ln(Population)	-0.011	-0.276***	-0.038***
		(0.011)	(0.017)	(0.004)
$\hat{Z}_7$:	Free Media	-0.097	-2.473***	0.420***
		(0.065)	(0.180)	(0.030)
$\hat{\beta}_0$:	Intercept	0.777***	6.925***	1.098***
		(0.264)	(0.384)	(0.077)
	Sector FE	Yes	Yes	No
	Country FE	No	Yes	No
	Country-Sector FE	No	No	Yes
	Observations	7,334	7,334	7,334
	R-squared	0.064	0.128	0.147

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

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